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## Mine/UXO Casualties and Casualty Surveillance in Cambodia

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## Mine/UXO Casualties and Casualty Surveillance in Cambodia

Handicap International's Reuben McCarthy details the combined efforts of HI, the Cambodian Red Cross and UNICEF in Cambodia. Putting faces with statistics, he gives the how, when and where of mine/UXO incidents in the country.



Landmine victims in Aulong Veng, Cambodia. c/o AP

by Reuben McCarthy,  
Project Advisor, Handicap International, Belgium

### Mine/UXO Casualty Surveillance in Cambodia

#### Introduction

Over the last five years Handicap International (HI) and the Cambodian Red Cross (CRC), with the technical support of UNICEF, have been involved in the collection, storage and dissemination of information related to the human casualties of mines and UXO in Cambodia. The following paper provides the background to the activity, its rationale and history, along with an overview of mine/UXO casualties in Cambodia from 1998 to 1999.<sup>1</sup>

In countries heavily contaminated with mines and UXO, mine casualty data<sup>2</sup> is seen as an essential element for fundraising and the effective targeting and prioritization of often limited resources, particularly in the areas of mine awareness, mine clearance and victim assistance. Depending on the scope of the information collected, mine casualty data may also provide a useful baseline for monitoring the aims and effectiveness of different components of such projects, establish mechanisms for the direct advocacy of mine affected communities, while providing valued support to national and international efforts to achieve a global ban on the sale, use and stockpiling of landmines.

Mine casualty data gathering was initiated in Cambodia by the Mines Advisory Group (MAG) in 1994. In early 1995, the Cambodian Mine Action Centre (CMAC) began a pilot project for casualty data gathering. Following the pilot project, the activity was outsourced by CMAC to CRC and HI. The two agencies were considered appropriate for the task in view of their work with the survivors of mine accidents, because of the national coverage of the CRC and its extensive network of volunteer health workers, and due to HI's ongoing role in mine action in Cambodia and experience in the development of indigenous organizations.

Starting in September 1995, HI and the CRC took full responsibility for the project on behalf of CMAC, in four provinces of Cambodia. The partnership involved CRC undertaking data gathering in provincial locations and HI providing training and technical support in the establishment of the data gathering system, database and the tools for data analysis and dissemination. Initially, the HI/CRC project was conducted in coordination with MAG's project, enabling coverage of a total of 11 of the most mine-affected provinces in Cambodia. In its formative stages, casualty data gathering in Cambodia comprised both a community and hospital level survey of accidents taking place during and prior to 1997, and ongoing surveillance of current incidents.

From 1995 to 1997, data gathering conducted by HI/CRC focused on a village level survey to provide comprehensive baseline data on the number and circumstances surrounding mine accidents in Cambodia, from 1979 to 1997. During this period more than 35,000 casualty reports were completed by HI/CRC in heavily mine-affected provinces.<sup>3</sup> At the same time, MAG established a mine incident surveil-

lance system, which concentrated on monitoring ongoing mine incidents. The intention was to provide up-to-date data on incidents and casualties and to facilitate the prioritization, planning and evaluation of mine related activities.

It was perhaps a unique feature of casualty data gathering in Cambodia that it combined survey with surveillance. The combined data sets enabled a comprehensive picture of the circumstances of mine incidents and occurrences of fatal and non-fatal injuries caused by mines and UXO throughout Cambodia. The documented history allowed patterns to be traced in the rate and type of mine injuries and established means for advocating the interests of an enormous number of mine accident survivors. At the same time, the surveillance of ongoing incidents enabled the effective prioritization of mine action resources and established a baseline for measuring the effectiveness of different aspects of mine action programs, on a month-by-month basis. Nonetheless, the dual system had certain weaknesses, not the least being the lack of standardization between the information collected and the techniques for prioritizing data gathering. By the end of 1997, however, most villages in heavily mine-affected areas had been visited by HI/CRC and a national data set of historical mine incidents was mostly finalized.

Subsequently, in 1998, HI/CRC and MAG agreed on a common system of data gathering, which focused on the surveillance of current or ongoing mine incidents and their human casualties. Both data sets were later merged into a single database, established and managed by HI/CRC, and a standardized data gathering form was used by both agencies. Priority areas for data gathering were, and remain largely, determined by the degree of mine contamination at a

commune, district and provincial level, as reported by MAG, CMAC and the HALO Trust. Additionally, the results of HI/CRC's national survey of mine victims have enabled the division of Cambodia into operationally high and low incident villages, districts, communes and provinces, according to the number of casualties recorded by the survey. Finally, an analysis of the history of the conflict in Cambodia, and areas known to have experienced large amounts of armed conflict, influenced the choice of sites.

Following the recommendations of a *Mid-Term Review* of MAG and HI/CRC's projects by UNICEF<sup>4</sup> in early 1999, MAG began to transfer the responsibility of its project to HI/CRC to enable greater standardization and use of the CRC volunteer network in data gathering. By November 1999, the transfer was complete, and HI/CRC was conducting data gathering in all of MAG's coverage areas, in addition to nine other provinces and municipalities, bringing the total coverage, by December 2000, to 20 provinces and municipalities.

In all of its aspects and phases of operation and development, mine casualty data gathering in Cambodia has as its central motivation the facilitation of a reduction and, ultimately, cessation of mine and UXO related casualties, through the collection and dissemination of timely and useful data on mine casualties to mine action agencies. Moreover, a key motivation of the project has been to provide support to survivors of mine and UXO accidents by disseminating information on the location and condition of survivors to victim assistance agencies. Thus far, the project has established an effective organization dedicated to the advocacy of the interests of mine victims and mine affected communities. To these ends, information provided by the project has facilitated:



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## Mine/UXO Casualties

- The discovery and location of new or unknown mined areas through the village level identification of mine accident sites.
- The design of appropriate mine awareness curricula through the identification of behavior leading to mine accidents and the types of devices causing the incidents.
- The ability to better help determine priorities for different mine action program components in different programs (mine awareness, survey, clearance, explosive ordnance disposal).
- The monitoring and evaluation of mine action activities.
- Increased awareness of the mine/UXO problem facing the Cambodian people, among the national and international communities.
- Fundraising among mine action and victim assistance agencies throughout Cambodia in the interests of mine victims and mine affected communities.

To date, the primary end users of the data have been MAG and CMAC in the development of their mine action programs; the Cambodian Campaign to Ban Landmines (CCBL) and the International Campaign to Ban Landmines (ICBL); and Geospatial International in support of

their National Level One Survey of the Mine and UXO situation in Cambodia. Along with agencies involved in mine action, the project has provided information support to numerous agencies involved in mine victim assistance.

From June to July 2000, UNICEF supported an external evaluation of the HI/CRC's project. The evaluation focused on an analysis of the stated objectives of the project and the system of data gathering employed. Overall, the recommendations were highly positive and will serve to guide the development of the project over the coming years. As of January 2001, the project continued to receive the technical and financial support of UNICEF, and gained additional financial support from the Ministry for Foreign Affairs of Finland and the U.S. Department of State.

### Mine/UXO Casualties in Cambodia: 1998-99

Cambodia is one of the most mine-affected countries in the world, both in terms of human casualties and land lost due to landmine and UXO contamination. Following nearly three decades of war, the military situation in Cambodia began to stabilize from

1997-1998, leading to an overall reduction in the number of human casualties caused by mines/UXO. Despite this, mines and UXO remain one of the foremost obstacles to development and are a present threat to the lives and livelihoods of the people of Cambodia, particularly as they enter areas previously inaccessible due to ongoing conflict.

The following section provides an overview of the situation of mine accidents in Cambodia from 1998 to 1999. Throughout this period, HI/CRC utilized 25 full-time data gathering staff and a coordinated network of volunteers, who reported incidents and casualties to the full-time staff. In partnership with MAG and with the technical assistance of UNICEF, data gathering was undertaken in an array of community settings, hospitals and physical rehabilitation centers. Information was gathered on the number, location and circumstances of mine incidents and casualties in Cambodia through direct interviews with casualties, their family members, witnesses to an incident, local authorities, hospital staff or other secondary sources.

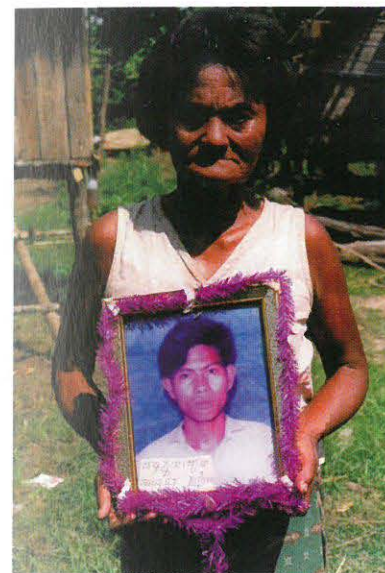
### Overview of Casualties: 1979-98

From 1979 to 1999, a total of 41,993 mine/UXO casualties were recorded in Cambodia, by HI/CRC and MAG.

- Throughout this period, there was a strong relationship between political violence and the total number of mine/UXO casualties. During periods of civil war casualties increase; during periods of relative peace, casualties decrease.
- Since the emergence of relative peace and stability in Cambodia from 1997 to 1999, mine/UXO related casualties steadily diminished, following a peak in 1996.
- From January 1998 to December 1999, a total of 2,690 people were

reported to be casualties of mine/UXO incidents in Cambodia. Of these, 1,685 casualties were reported in 1998, and 1,005 in 1999.

- In 1996, an average of 253 Cambodians suffered mine incidents per month. In 1997, the rate of casualties decreased to 137 a month; in 1998 a slight increase was recorded and an average of 140 casualties per month were reported; while in 1999 the average decreased significantly to less than 84 casualties per month.



■ Kreng Liep holds a photo of her son who was killed when he drove his ox cart over an AT mine.  
c/o UNA-USA Debra Boyle

- The decrease in mine/UXO related casualties may be attributed to a multitude of factors, but the cessation of conflict in 1998, a stabilized political situation, a more settled population with an increased knowledge about the location of mined areas and the mine situation in general, and increased clearance activities all play an important part in a reduction of accidents, though no single factor can or should be attributed to the reduction.

### Casualties in 1998-99 by Age and Gender

- Of all casualties in 1998-99, 91 percent were males, while 9 percent were females.
- Among children, as among adults, males made up the majority of casualties. Nonetheless, girls suffered at a higher rate (as compared to boys) than did women (as compared to men). Nineteen percent of the child casualties were girls. Among adults, only 6 percent of recorded casualties were women.
- In general, adults were killed or injured four times as often as children. Children (under 18 years old)<sup>5</sup> made up 20 percent of all casualties.
- Adult males, 18 to 40, suffered the most from mines and UXO.
- However, the casualty rate among children as a proportion of total casualties actually increased.

### Occupation

- In both 1998 and 1999, more civilians suffered from mines and UXO than did members of the military. The last year in which military casualties outnumbered civilian was 1996, and civilian casualties as a proportion of total casualties (civilian and military) are increasing dramatically.
- In 1999, the gap between civilian and military casualties widened dramatically.
- Though civilians suffered to a greater degree (in absolute numbers) than members of the military, in relative terms (as a fraction of the total exposed population), members of the military remained at a far greater risk of becoming a casualty of mines or UXO than civilians, though their accidents were not always associated with military activities.

Table 1

	Casualties	% of Total
Men	2,020	75%
Children <18	536	20%
Women	128	5%
Unknown	6	0.002%
<b>Total</b>	<b>2,690</b>	<b>100%</b>

Table 1. Total mine/UXO casualties: 1998-1999.

### Injuries

- From 1998-99, the majority of mine and UXO related injuries were wounds (minor and major), while the second most frequent injury type was the amputation of one or more limbs. (see Table 2.)
- Both mines and UXO are more likely to cause amputation and/or wounds to lower limbs than to any other part of the body.
- From 1998-99, 20 percent of all casualties were reported as dying from their injuries, while 80 percent suffered non-fatal injuries. Death was more common among elderly adults (less than 40 years), than for infants, children and younger adults.
- From 1979-99, 34 percent of incidents resulted in death. Though total incidents varied due to political and military factors, the fraction of incidents that resulted in death

Table 2

Injury Type	Cases <sup>6</sup>
Wounds	1,597
Amputation (one or more limbs)	944
Death	550
Burns	265
Blindness	165
Deafness	164
Paralysis	16
<b>Total</b>	<b>3,701</b>

Table 2. Injuries sustained: 1998-1999



■ A young boy who lost his leg to a mine blast.  
c/o ICRC/Tim Mayer



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steadily declined over the entire period.

- From 1998–99, casualties suffering amputation or death by mine/UXO were geographically concentrated in the north, northwest and southeast provinces of Cambodia, with little variation between the two types of casualty.

### Medical care

- The majority of mine/UXO casualties had their injuries treated either in a provincial or district level hospital (see Table 3.).
- A significant minority of casualties received no medical assistance at all, indicating very minor injuries or death at the site of the incident or enroute to a medical facility.
- The majority of casualties received first aid/care within thirty minutes of suffering their accident.
- Casualties whose access to medical facilities was between 30 minutes and two hours were more likely to suffer amputation than those had access in less than 30 minutes.
- Of the 835 cases of amputation, requiring some kind of orthopedic device, a total of 449 prosthetic devices were received by casualties.



■ Cheap Chea points to a landmine that he found in his field.  
c/o UNA-USA, Chim Sereivuth

The number is not, however, necessarily a reflection of the effectiveness or lack thereof of orthopedic services in Cambodia, because many casualties may not have been ready to receive a device at the time of their interview.

### Cause of Injuries

#### Device

- In 1998 and 1999, 70 percent of all incidents involved mines and 29 percent involved UXO. (see Table 4)
- Since 1994, incidents involving UXO have increased as a proportion of total incidents, while those involving mines have decreased.
- Children were more likely to be injured as a result of UXO than adults.
- In 1998 and 1999, both mines and UXO incidents varied with the season: wet season and dry season. More casualties were reported during the dry season as rural Cambodians travel more and as they seek alternative sources of income to rice farming. Fewer casualties were reported during the rice planting and harvesting seasons, when populations are less mobile.
- In periods of conflict, mine incidents rise and UXO incidents decrease. In periods of relative peace, mine

Table 4

Device	Casualties	% of Total
Mine	1,885	70%
UXO	768	29%
Unknown <sup>7</sup>	37	1%
<b>Total</b>	<b>2,690</b>	<b>100%</b>

Table 4. Casualty causing device: 1998–1999.

incidents decrease, while UXO incidents tend to increase.

### Activities Associated With Incidents

- In 1998 and 1999, the three most important activities that led to mine incidents were: 1) tampering, 2) military activities, and 3) traveling (see Table 5.).
- However, if all activities associated with one's livelihood are taken together, livelihood is the most common associated activity leading to mine incidents, followed by military and tampering.
- Tampering incidents almost exclusively involved UXO, while incidents involving mines were more often associated with livelihood activities.

Table 5

Activity	Casualties	% of Total
Tampering	762	27%
Military activities	514	19%
Traveling	498	19%
Farming	364	14%
Collecting wood	264	10%
Collecting food	134	5%
Herding	55	2%
Fishing	49	2%
Unknown	32	1%
Other	17	1%
Trading	1	0%
<b>Total</b>	<b>2,690</b>	<b>100%</b>

Table 5. Incident associated activities: 1998–1999.

- Children were more likely to be injured while tampering than were adults.<sup>1</sup> Adults were more likely to be injured while undertaking military or livelihood activities than were children.
- Both tampering and livelihood activities followed the same pattern in 1998 and in 1999: they fell during the rice growing and harvest season and peaked during the dry season.
- Military activities led to far fewer total casualties in 1999 than in 1998. At the same time, incidents involving the military followed the same seasonal patterns as those

involving civilians, largely because of the “dry season offensives” conducted by the military.

### Locations When Injured

- As in previous years, the majority of mine and UXO casualties were concentrated in the northwest of Cambodia. This is particularly true for military casualties, while civilian casualties covered a greater geographic area.
- From 1998–99, a greater concentration of mine and UXO casualties were recorded on the Thai-

Cambodia border than were reported in 1997. This is partly explained by a greater capacity of the project to collect data in these areas in 1998 and 1999, following a cessation of conflict.

- Mine incidents (excluding UXO) are more concentrated in the northwest than UXO incidents (excluding mines). UXO incidents are more geographically spread out and a greater number of casualties involved in UXO incidents were recorded on the Vietnam-Cambodia border than mines.
- In 1998–99, Bat Dambang province continued to rank as the province recording the highest number of mine and UXO casualties (see Table 6.).
- In 1998–99, Samlout District, in Bat Dambang province, recorded the highest number of casualties. However, if the number of casualties is taken as a percentage of the total population, Veal Veang District, Pousat province, is the most affected district.
- For the same period, Traeng Commune in Bat Dambang province recorded the highest number of casualties. However, if the number of casualties is taken as a percentage of the total commune population, Sala Krau Commune,

Table 3

Medical Assistance	Casualties	% of Total
Provincial Hospital	828	32%
District Hospital	593	22%
None	383	14%
Unknown	384	14%
Army Hospital	190	7%
Self-treated	104	4%
Other	89	3%
Private Clinic	59	2%
Commune Health Centre	51	2%
Traditional doctor	5	0.001%
Wat/monks	4	0.001%
<b>Total</b>	<b>2,690</b>	<b>100%</b>

Table 3. Medical assistance received: 1998–1999.

Table 6

Rank	Province	Total Casualties	Cum Total	% of Total	Cum %
1	Bat Dambang	790	790	29.4%	29%
2	Banteay Mean Chey	405	1,195	15.1%	44%
3	Otdar Mean Chey	331	1,526	12.3%	56%
4	Preah Vihear	281	1,807	10.4%	66%
5	Siem Riep	169	1,976	6.3%	72%
6	Pousat	149	2,125	5.5%	78%
7	Kampong Thom	126	2,251	4.7%	83%
8	Kampong Cham	107	2,358	4%	87%
9	Krong Pailin	97	2,455	3.6%	91%
10	Svay Rieng	49	2,504	1.8%	93%

Table 6. Ten most affected provinces for mine/UXO casualties: 1998–1999.



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Krong Pailin province, is the most affected commune.

- From 1998 to 1999, Ampil Village, in Bavel District, Bat Dambang province, recorded the highest number of casualties with incidents taking place in villages.

### Terrain Type(1998-99)

- The overwhelming majority of mine and UXO incidents (72 percent) occurred in three types of terrain: forests, villages and fields (see Table 7).
- Incidents taking place in fields are seasonally based and occur more frequently in the wet season, while incidents occurring in forests occur more frequently in the dry season. Incidents occurring in villages, on paths and roads, or near rivers do not demonstrate any major seasonal variations.



■ Mr. Phia lost his leg to a landmine. c/o UNA-USA Chim Sereivuth

### Mine Incident Prevention Mine Awareness Training

- Eighty-two percent of casualties were reported as not having received mine awareness training prior to their incident.
- The results indicate either a severe lack in mine awareness training, or the impression that people who receive mine awareness training are less likely to be involved in an accident than those who do not.
- Both women and children received proportionately more mine awareness training than adult men, even though adult men are a higher risk group, suggesting a need to refocus training on them.
- Assuming that a lack of mine awareness among casualties indicates the weakness of the activity, the location of casualties not having received mine awareness training vis-à-vis the rate of casualties indicates a need to reconsider the concentration of mine awareness activities in certain provinces of Cambodia.

### Mined Area Marking and Mine Clearance at the Site of the Incident

- Only 2 percent of incident sites were reported as being marked with official mine field markings at the time of the incident.
- Only four percent of incident sites had any previous mine clearance.
- The results suggest that the majority of incidents are taking place in areas not known to be mined, not surveyed, or not prioritized as being high priority for clearance or marking activities.
- The results do not tell us what mine action or survey activities may have been conducted following any reported mine incident.
- The Mine Incident Database Project is performing a vital and unique function within the mine action context in Cambodia and provides valuable information that assists different agencies and governmental bodies in multiple areas of activity.

(Chris Horwood and Andrea Crossland, *External Evaluation of UNICEF-Supported Activities to Prevent Mine Incidents*, June-July 2000).

Table 7

Area Type	Casualties	% of Total
Forest	999	38%
Village	573	21%
Field	363	13%
Path/road	287	11%
Near river	183	7%
Mountain	118	4%
Near military base	108	4%
No answer	43	2%
Other	10	0%
Overgrown area	6	0%
<b>Total</b>	<b>2,690</b>	<b>100%</b>

Table 7. Incident location by terrain type: 1998-1999.

- The majority of incidents (35 percent) took place within five kilometers of village centers.
- For the same period, 39 percent of all casualties were reported to have visited the site of their accident often, prior to the incident taking place.

## Mine/UXO Casualties

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<sup>1</sup> Excerpts obtained from the report *Mine & UXO Casualties in Cambodia: 1998-1999*; Cambodia Mine/UXO Victim Information System (ne. Mine Incident Database Project), September 2000.

<sup>2</sup> Unless otherwise specified, where the term "mine victim/casualty" is used alone it is taken to include UXO casualties.

<sup>3</sup> By September 2000 the number of casualty reports reached in excess of 45,000.

<sup>4</sup> At the time UNICEF was providing financial and technical assistance for both MAG and HI/CRC. In 1999, HI/CRC received additional funding support from the Ministry for Foreign Affairs of Finland, and in 2000 from the U.S. Department of State (Grant: S-PMHDP-00-GG-0021). The opinions, findings and conclusions contained in this paper are those of the author and do not necessarily reflect

those of the U.S. Department of State, the Ministry for Foreign Affairs of Finland or UNICEF.

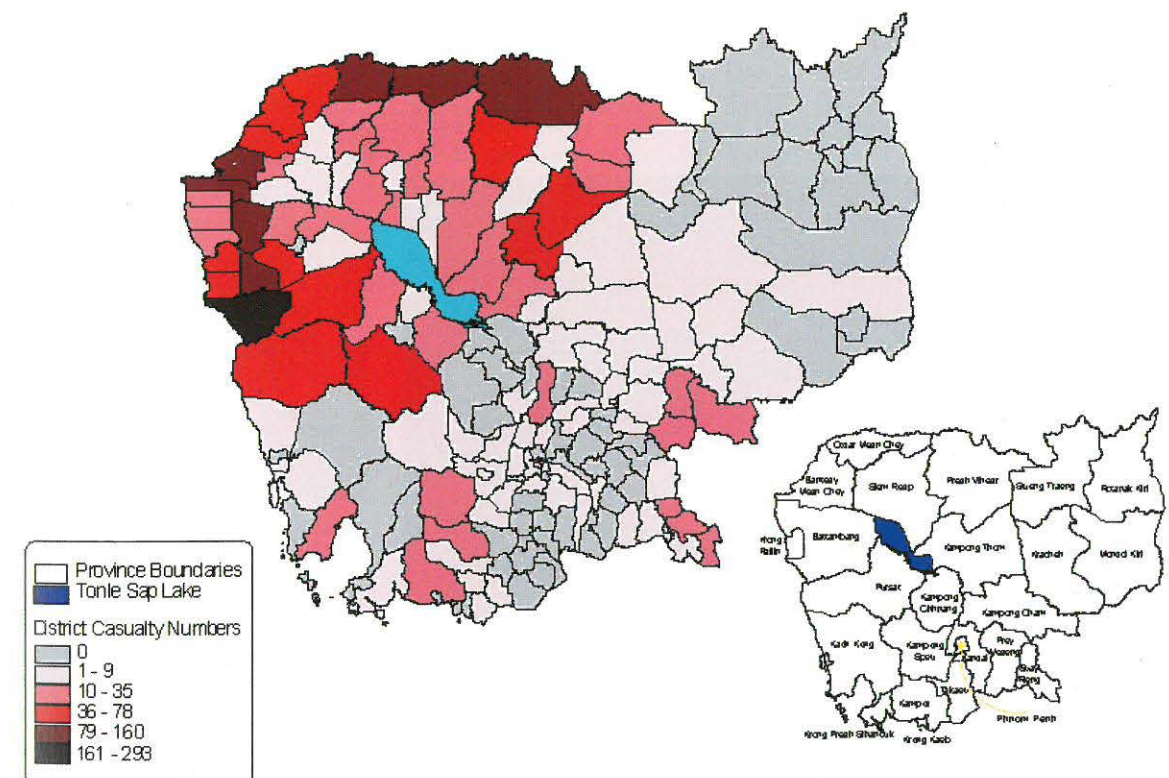
<sup>5</sup> The definition of a child being less than 18 years of age follows from the definition outlined in the *Convention on the Rights of Children*.

<sup>6</sup> The number of injury cases does not correspond to the number of casualties because many casualties suffered multiple injuries. Injuries that led to death are also included.

<sup>7</sup> Unknown: unidentified devices often reported by third parties. Sometimes fuses.

<sup>8</sup> It was a shortfall of the survey questionnaire and methodology during 1998 and 1999 that people who may have witnessed another person tampering with a device and were subsequently injured in an incident were also recorded as tampering.

### Mine/UXO Casualties in Cambodia: 1998-1999



Handicap International & the Cambodian Red Cross